The World's first cost effective, electronically steerable, digital, low profile, phased array antenna to enable high speed satellite communications on the move

Rendicontazione

Informazioni relative al progetto

Phasor

ID dell'accordo di sovvenzione: 666741

Sito web del progetto

DOI
10.3030/666741

Progetto chiuso

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Data di completamento
31 Marzo 2017

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INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)

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€ 2 925 093,75

Contributo UE
€ 1 516 545,00

Coordinato da
PHASOR SOLUTIONS LIMITED
United Kingdom

Periodic Reporting for period 3 - Phasor (The World's first cost effective, electronically steerable, digital, low profile, phased array antenna to enable high speed satellite communications on the move)

Periodo di rendicontazione: 2016-11-01 al 2017-03-31

Sintesi del contesto e degli obiettivi generali del progetto

Phasor has developed the world's first cost effective, electronically steerable antenna to be used for high speed satellite communications on the move. The overall objective is to enable Phasor to gain a substantial market share in the Satellite Communications-on-the-Move (COTM) market and associated antenna markets. These 'mobility' markets represent a key growth area for the satellite communications industry and the need for such antennas is frequently cited as fundamental and critical to its future success for both existing geo-stationery satellite services to moving platforms but of even greater importance to the new Mega-Constellation services of LEO and MEO systems such as Oneweb and Leosat. Phasor expects to capture new markets in land transport, aerospace and maritime applications for GEO satellites but also the much wider market of fixed land based services associated with LEO & MEO services.

The demand for mobile communications has been growing rapidly for several decades and global data traffic has been increasing exponentially. Users of communication platforms demand fast and affordable connectivity, but current satellite communication antennas cannot fully meet this large and growing need: Mechanically steerable antennas are bulky, heavy and pose considerable vehicle integration challenges. Phased arrays based on military technology are too costly for commercial applications and low cost antennas trade-off the cost of the antenna against the requirement for much more expensive satellite bandwidth per Mbps transmitted. By exploiting disruptive technology, Phasor has a low cost market solution that is capable of meeting current and future market needs.

Lavoro eseguito dall'inizio del progetto fino alla fine del periodo coperto dalla relazione e principali risultati finora ottenuti

The overall objective of the project was to successfully refine and scale up for market readiness the world's first cost effective, electronically steerable, digital, low profile phased antenna to enable high speed satellite communications on the move.

During the 1st Reporting Period of the project, Phasor completed the design refinement and customer consultation exercises in WP1. Feedback received from customers highlighted several extra features and requirements, principle of which was the desire for a small antenna footprint, which we included in the design activities in WP2, WP3 and WP4.

During the 2nd Reporting Period, Phasor took the decision to integrate both the Receive and Transmit antennas into a single compact unit. Initially this decision delayed the ASIC manufacture, however our engineers then identified that using a combination of a minor update to our current version 3 ASIC, by updating the masks only rather than the need for a complete new ASIC, we could achieve the objectives and the data performance rates required by our customers and for the project. A parallel development activity to develop the minimal changes needed on the PST3, to become PST3a,

together with new RF antenna design was undertaken and which was successfully developed as listed below:

• Combination of any number of modules – without loss
• Fully electronically steered – no moving parts
• >200°/sec steering rate
• >2 GHz tuning range (Rx)
• Dual fully independent beams from single aperture
• Transmit & Received from a single aperture
• Rx only and Tx only also available
• Very high EIRP capability
• Ultimate off-axis performance – achieved from software controlled antenna

The new design was prototyped, tested and demonstrated to potential customers in September 2016 and showed that the new design clearly met the project objective and our customer performance requirements.
During the 3rd Reporting Period, Phasor have secured further private funding and are continuing to raise further private funding post project. Since the end of the project following a successful demonstration of the technology at the Monaco Yacht Show several large investments have been received, which will enable Phasor to launch the initial products during 2018.

Phasor are also obtaining the required aeronautical certification for the hardware to be flown on civil commercial aircraft (STC).

In summary, electronically steerable antenna technology is perceived as a game-changer for satellite communication-on-the-move services across rapidly expanding aeronautical, maritime & land-mobile vehicular mobile broadband markets.
Phasor has a unique offering in this field at present and is now very well placed to exploit the market, due to our technology's much more advanced stage of development which will ensure we are the first to market with a commercial product.

Progressi oltre lo stato dell'arte e potenziale impatto previsto (incluso l'impatto socioeconomico e le implicazioni sociali più ampie del progetto fino ad ora)

Electronically steerable antenna technology is perceived as a game-changer for satellite communication-on-the-move services across rapidly expanding aeronautical, maritime & land-mobile vehicular mobile broadband markets and is also a pre-requisite to support the $10bn invetsments being made in LEO/MEO satellite constellations.
As an innovative SME Phasor have been in frequent and close contact with our users to understand their specific needs. The current state of the art has significant limitations and does not fully meet their own or their downstream users' needs. Furthermore the viability of the new Mega-Constellations projects is dependent on availability of this new technology.

The USPs have been delivered as originally planned in the project and are summarised below:
• Cost effective/rapid payback - our innovations allow us to compete on price with mechanically steerable antennas and on performance with military phased array antennas
• High performance - data rates scalable up to 100Mbps.
• Low profile/high aesthetics – low depth creates pleasing visuals and low drag antenna installation, yielding fuel efficiencies for high speed vehicles.
• Adaptable/conformable to any surface and retrofitttable - panels can be installed on curved surfaces, eliminating the unwanted high-profiles associated with current technologies.
• Modular and scalable - panels can be combined to produce larger antenna which support faster data transfer rates providing more economic connectivity.
• Reliable/zero-maintenance - solid state with no moving parts.
• Satellite auto-tracking/fast refresh rates - milliseconds compared to tens of seconds for mechanical steerable antennas.
• Low shipping and storage costs - panels are easily stacked and boxed, lowering the costs associated with shipping, storage and installation, a top priority for many markets.
The delivered USPs as listed above provide specific economic benefits to users compared to the current state of the art, primarily mechanically steerable dishes. The Phasor antenna provides a much better ROI compared to a conventional disc antenna.
Efficiency has been gained by virtue of the fact that the Phasor solution can be used at virtually all skews and elevation angles whilst operating with conventional modulation schemes. Ultimately, the primary cost of providing such services is the cost of satellite capacity. By enabling a significant reduction in this component of OPEX costs, a significantly more profitable service can be supported at an attractive cost to the end user.
The expansion of wireless presence enables increases in the number of consumers accessing and relying on mobile networks. The need for high data rate internet connectivity in all markets is supported by this project, including the emerging 5G market.

Phasor Project

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